10/811,816 Request for Reconsideration Exhibit E

BEST AVAILABLE COPY

# Focusing Objective Theory

Some focusing applications may require a higher degree of aberration correction than can be achieved in single lenses such as Bestforms. Whether correction over larger apertures, several wavelengths or a wider field is needed, it may be necessary to use multi-element lens objectives.

## Aberration Correction

A Bestform lens singlet is corrected for minimal spherical aberration. However, other aberrations will become prevalent in such a lens as field angle, aperture size, numerical aperture or wavelength bandwidth is increased. Coma and astigmatism are the two most important. Both are dependent on field angle. Using a combination of differing optical materials, judicious guessing and computer controlled lens design software, many lens objectives can be made relatively aberration free. Depending on the F/# and degree of achromaticity, most on-axis focusing applications can be satisfied with objectives having three lenses or less.

## Single Line Objectives

All Special Optics Single Line Focusing Objectives are corrected for astigmatism and coma over the specified spectral range. However, they are not corrected for chromatic aberrations. These lenses are well suited for use with Solid State and Gas Lasers where only one wavelength is in use, or when shifts in focal length can be tolerated as the wavelength is changed. The operating wavelength must be specified when ordering to indicate the appropriate anti-reflection coatings.

## Achromatic Objectives

An advantage of additional lens elements is the ability to combine lenses of different materials and optical properties to correct for chromatic aberrations. Achromatic Focusing Objectives are aberration corrected at two wavelengths simultaneously. A doublet consisting of two lenses of different materials can be designed such that the effective focal length and performance will be the same at two separate wavelengths.

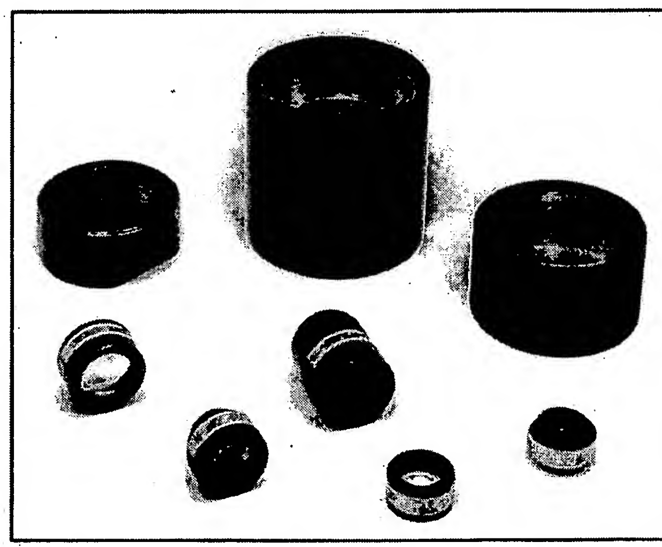
## Apochromatic Objectives

Special low dispersion glasses allow for the design of lenses which are chromatically corrected for a range of wavelengths. Such lenses are referred to as having minimal secondary spectrum. Camera lenses are an extreme example of apochromatic lenses.

## Laser Diode Collimators

Semiconductor lasers often require specialized lenses due to their unique characteristics. In general, laser diodes are small point sources with large numerical apertures. Laser Diode Objectives are designed to accommodate the large input angles associated with these compact laser sources. Standard designs offer diffraction limited performance for numerical apertures as high as 0.6, making them useful for fiber optic coupling or collimating.

The spectral range of our Diode Collimators is extended into the infrared region allowing for operation with most diodes within the 670 nm to 1550 nm wavelength range. The lenses may also be combined to produce focusing or non-focusing configurations as desired. Though designed for use with Diode Lasers, these lenses may be used with other lasers requiring highly corrected lenses within the visible and near infrared spectral range.



SPECIAL OPTICS - 315 Richard Mine Road, Wharton, New Jersey 07885 Phone 973-366-7289
Fax 973-366-7407 E-mail SpecOpt@aol.com